Housed in an enviable neighbourhood with myriad amenities, good transport networks and leisure options, Coco Palms is ideal for individuals, couples and families. There is excellent accessibility to the city via MRT, buses and expressways such as ECP, PIE and TPE. Coco Palms is also a short drive to shopping and lifestyle attraction Jewel Changi Airport, IKEA Tampines, Giant and Courts, which are one-stop stores for home essentials. Leisure and recreational options abound at the nearby Pasir Ris Park, Tampines Biking Trail and Downtown East.

Testament to its sustainable design, Coco Palms has received a string of accolades including the BCA Green Mark GoldPLUS Award.

Developer: Hong Realty (Private) Limited
Project Manager: City Developments Limited
Quantity Surveyor: Arcadis Singapore Pte Ltd
Architect: AXIS Architects Planners Pte Ltd
C&S Consultant: Parsons Brinckerhoff Pte Ltd
M&E Consultant: Meinhardt (Singapore) Pte Ltd
Landscape Consultant: Tinderbox Landscape Studio Pte Ltd
Project Interior Designer: AXIS ID Pte Ltd
Main Contractor: Woh Hup (Private) Limited
Sustainability is a concept that has been gaining momentum in Singapore in recent years as more people realise that nature’s resources are becoming increasingly scarce and finite.

Under the Paris Agreement, Singapore has pledged to reduce its carbon dioxide emissions intensity by 36 per cent from 2005 levels and simultaneously cap its emissions by 2030. As a result, significant efforts have been made to decrease emissions, including the greening of the country’s transport systems and buildings.1

It is no surprise that sustainability in Singapore’s built environment is being taken very seriously. The country is aiming for at least 80 percent of buildings to achieve the Green Mark Certification— a testament to environmentally-friendly living.

The role of concrete in reducing environmental carbon emissions is a notion that is beginning to reach new levels of awareness in the built industry. In fact, the built environment is in a prime position to address the emergency of climate change through the reduction of embodied carbon emissions from our buildings and infrastructure assets, according to the Bringing Embodied Carbon Upfront report published by the World Green Building Council (WorldGBC) in September 2019.

The built environment is responsible for 40 percent of global carbon emissions, with embodied carbon emissions being especially critical. Unlike operational carbon that can be saved over the lifetime of a building, embodied carbon emissions are produced during the development works before a building project is completed. These embodied emissions are produced throughout the supply chain of materials and systems used in the project. If embodied carbon emissions are not addressed before the building project moves past the design stage, there is no way for building owners to reclaim lost carbon savings once the building is constructed and subsequently used.

The breakdown of carbon emissions for buildings is typically 30 percent embodied carbon emissions versus 70 percent for carbon emissions due to building operations. In Singapore, where the lifespans of buildings tend to be shorter due to urban renewal, the embodied carbon emissions of buildings can constitute up to 40 percent of the total carbon emissions over the lifespan of the building.

The upfront emissions from materials and products used to construct buildings and infrastructure, and those installed later during maintenance and renovation, usually represent a significantly greater source of embodied carbon than all other stages in the lifecycle. Globally, cement and steel are two of the most important sources of material-related emissions in construction. Cement manufacture is responsible for around 7 percent of global carbon emissions, with steel also contributing 7-9 percent of the global total, of which around half can be attributed to buildings and construction.

For one industry player, however, embedding sustainability in ready-mix concrete is a long-time passion that began way back in 2001. That was when Pan-United Corporation Ltd (Pan-United) – a SGBC Founding Member – started an in-house research arm to develop high-performance concrete products that were commercially viable with sustainability at the core of its innovations. Since then, quite a few of the specialised concrete products were custom-developed in partnership with property developers and construction companies owners to achieve their green targets.

Pan-United has developed a suite of over 300 specialised concrete products, of which over a hundred satisfy its criteria of using either recycled or reused materials, or production processes that are sustainable. In 2017, it was the first concrete company to be awarded the highest “Leader” certification for at least 150 of its green building products under the Singapore Green Building Council’s (SGBC) Singapore Green Building Product (SGBP) certification scheme. In 2019, Pan-United was also conferred the Leadership in Green Innovation award.

Research and development work done by scientists at Pan-United’s Innovation Centre has created more than 300 specialised concrete products. Among them is PanU Shield which reduces the thickness of concrete walls in hospital proton therapy rooms for cancer treatment (pictured below) from 6 metres to just 1.6 metres.
Scoring Green Marks with Sustainable Concrete Innovation

Building Product accolade under the SGBC-BCA Sustainability Leadership Awards 2019 for its onus on building a greener built environment.

Today, Pan-United continues to develop more concrete products that will upcycle waste and reduce CO2 emissions. For instance, Pan-United collaborated with the National Environment Agency (NEA) to design and produce a 3D-printed concrete bench using NEWSand, a material made from repurposed municipal solid waste slag. The bench was unveiled at NEA’s Year Towards Zero Waste event in November 2019. NEWSand is undergoing trials for future road construction projects.

Pan-United’s game-changing concrete technologies crossed a milestone in July 2020 when it signed on a collaboration deal with leaders from other industries – Chevron, Keppel Data Centres and Surbana Jurong – to combine resources to develop Singapore’s first end-to-end decarbonisation process. With the support of the National Research Foundation, the four partners aim to accelerate the development of a carbon capture, utilisation and sequestration (CCUS) system that can contribute to a low-carbon economy. Since then, Pan-United has signed on more deals with other industry partners to develop cleantech solutions for urban infrastructure projects.

CAPTURING CARBON

Pan-United uses a carbon sequestration technology to trap CO2 in its concrete forever. This also increases the compressive strength of the concrete and enables less cement to be used. By partnering with Canada-based clean technology company CarbonCure Technologies to introduce this technology to Asia, Pan-United estimates that it can potentially reduce carbon emissions at each of its concrete plants by over 4,000 tonnes annually.

Such a breakthrough technology will go a long way to reduce the embodied carbon in the built environment. This refers to the carbon emissions released during the manufacturing, transportation, and construction phases of a building. As posited by the WorldGBC report on embodied carbon, these emissions are expected to be responsible for half of the entire carbon footprint of new construction.

Aiming to introduce this technology to other ready-mix concrete producers locally and regionally, Pan-United can spearhead an industry-wide movement towards decreasing carbon emissions from the manufacture of concrete.

The NEWSand Bench sponsored by Pan-United was unveiled at the Year Towards Zero Waste event in November 2019. Seated on the bench from left are Mr Masagos Zulkifli and Dr Amy Khor, then the Minister and Senior Minister of State for the Environment and Water Resources, respectively.

Pan-United inked a strategic partnership with CarbonCure Technologies in November 2018 to use the Canadian cleantech company’s carbon sequestration technology to produce sustainable concrete that is stronger and uses less cement.
Pan-United developed a new type of self-compacting concrete called PanU NewGen SCC in early 2020 when the COVID-19 crisis brought the construction industry to a virtual halt. Compared with the original self-compacting concrete it developed in 2008, Pan-United’s 2020 version is a specialised rheologic concrete that improves productivity by 75 percent while reducing casting time by 40 percent. Thus, construction is made faster even with better safe distancing of workers.

SCC behaves like a liquid, flowing easily and naturally on its own weight. It reaches and fills any position or formwork completely and uniformly. The concrete self-compacts and removes all air voids in the placed concrete. Noise-pollutive mechanical compactors are no longer needed, making it ideal for high-density residential or commercial locations where noise levels must be minimised.

The multi-purpose properties of SCC meet exacting demands for high strength and durability. This supports load-bearing structures such as skyscrapers. It also allows construction workers to work more efficiently: only a single worker is required to guide the concrete pumping pipe around the slab area, instead of many more concreting workers manually compacting the concrete into place.

SCC has been used in many notable projects in Singapore, including the iconic Jewel Changi Airport, Gardens by the Bay and Tanjong Pagar Centre, the tallest building in Singapore. It has also shaped other towering skyscrapers such as Landmark 81 in Ho Chi Minh City, the tallest building in Vietnam standing at 462 metres high. These are by no means small developments, and casting any formwork for these developments must be done in a single continuous pour of multiple batches of consistent quality concrete.
During casting, batches of wet concrete mix must be delivered to the worksite continuously and successively, and in a just-in-time manner. To achieve this delivery precision, Pan-United leverages its operations optimisation platform called AiR, Artificial Intelligence for Ready-Mix Concrete, the only one of its kind in Singapore’s concrete industry.

For instance, during the construction of Tanjong Pagar Centre, the AiR platform optimised the entire supply chain from end to end, ensuring an uninterrupted convoy of one truck every 90 seconds to deliver the wet mix. The single continuous mass pour was achieved in less than two days what would normally have taken over six days to complete.

Pan-United firmly believes that industry transformation and disruption are inevitable. Using its twin strengths of an innovation culture and strong technology capabilities since its early days, the company is building on its sustainability initiatives to catalyse a national impact in the built environment industry, both Singapore and globally.

THE WAY FORWARD

Pan-United firmly believes that industry transformation and disruption are inevitable. Using its twin strengths of an innovation culture and strong technology capabilities since its early days, the company is building on its sustainability initiatives to catalyse a national impact in the built environment industry, both Singapore and globally.

Going green is clearly the way forward.

Resources: